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FORM PTO-1390 (REV 11-98) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	
DEN272	
U.S. APPLICATION NO. (If known, see 37 CFR 1.5)	
09/673115	

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/FR99/00873	14.04.99	16.04.98

TITLE OF INVENTION
DEVICE FOR INCREMENTAL MEASUREMENT OF POSITION

APPLICANT(S) FOR DO/EO/US
Jean-Pierre BAZENET

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. [X] This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. [ ] This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. [ ] This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. [ ] A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. [X] A copy of the International Application as filed (35 U.S.C. 371(c)(2))
   a. [X] is transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] has been transmitted by the International Bureau.
   c. [ ] is not required, as the application was filed in the United States Receiving Office (RO/US).
6. [X] A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. [ ] Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
   a. [ ] are transmitted herewith (required only if not transmitted by the International Bureau).
   b. [ ] have been transmitted by the International Bureau.
   c. [ ] have not been made; however, the time limit for making such amendments has NOT expired.
   d. [ ] have not been made and will not be made.
8. [ ] A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. [X] An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. [ ] A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern document(s) or information included:

11. [ ] An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. [ ] An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. [X] A FIRST preliminary amendment.
    [ ] A SECOND or SUBSEQUENT preliminary amendment.
14. [ ] A substitute specification.
15. [ ] A change of power of attorney and/or address letter.
16. [ ] Other items or information:

17. A verified Statement (Declaration) Claiming Small Entity Status (37 CFR 1.9(f) and 1.27(b) Independent Inventor.
18. A copy of Notification of Transmission of International Preliminary Exam Report
19. Copy of International Preliminary Exam Report
20. Copy of International Search Report
21. An Abstract
22. An Appointment of Domestic Representative
23. A copy of the Request

EXPRESS MAIL LABEL NO. EK752842283US

09/673115

Attorney Docket No. DEN272

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In re Patent Application:

Inventor: Jean-Pierre Bazenet

Filed:

Title: DEVICE FOR INCREMENTAL MEASUREMENT OF POSITION

APPOINTMENT OF DOMESTIC REPRESENTATIVE

Thomas S. Baker, Jr., Attorney-At-Law, Registration No. 25,662, whose postal address is 1371 West 3rd Avenue, Columbus, Ohio 43212, U.S.A.. Telephone: 614/488-2202; Facsimile: 614/488-2232, is hereby designated Applicant's domestic representative upon whom notice of process in proceedings affecting this assignment may be served and to receive the recorded Assignment document.

Respectfully submitted,

Date: Sept 14th, 2000

J. Bazenet

By: Jean-Pierre Bazenet
Title: Inventor

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EXPRESS MAIL LABEL NO. EK752842283US

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Attorney Docket No. DEN272

International Application No.: :

PCT/FR99/00873 :

Applicant: Jean-Pierre BAZENET :

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14 April 1999 :

Published Under No. WO/99/54687 on 28 October 1999 based on FR/98/05041 filed 16 April 1998 :

Priority Date: 16 April 1998 (16.04.98) :

For: DEVICE FOR INCREMENTAL MEASUREMENT OF POSITION :

Commissioner of Patents and Trademarks
BOX PCT
Washington, D.C. 20231

FIRST PRELIMINARY AMENDMENT

Dear Sir:

Please amend the application as follows:

Please add the enclosed Abstract.

In the Claims:

Please amend Claim 3 as follows:

3. (Amended) Device according to claim 1 [or 2,) characterized in that the scale (1) consists of a stainless steel ribbon (3).

Please amend Claim 4 as follows:

4. (Amended) Device according to [one of] claim[s] 2 [or 3,] characterized in that each coil (8, 10) comprises a winding arranged in a coil form (9) consisting of a ferrite pot core whose dimension, in the lengthwise direction of the scale (1) appreciably corresponds to the dimension (p/2) of the openings along the same direction.

Please amend Claim 5 as follows:

5. (Amended) Device according to [any of] claim[s] 2 [to 4,] characterized in that each of the coils comprises at least two windings electrically mounted in series and arranged in a common coil form, in such a way that the two windings are spaced, lengthwise along the scale, a distance of n x p apart, where n is an integer.

Please amend Claim 6 as follows:

6. (Amended) Device according to [any of] claim[s] 2 [to 5,] characterized in that each receiver (10) coil has means (15) arranged in parallel for tuning the transmission frequency and means (16) for establishing symmetry between the reception levels of the two coils (10).

Please amend claim 8 as follows:

8. (Amended) Device according to [any of] claim[s] 2 [to 7,] characterized in that the transmitter (6) and the receiver (7) each comprise two coils (8, 10) offset lengthwise along the scale (1) by n x p + p/2, where n is an integer, in such a way that the interval (5) between two successive openings (4) falls between a transmitter (6) coil (8) and the corresponding receiver (7) coil (10) whenever an opening (4) falls between the other transmitter (6) coil (8) and the corresponding receiver (7) coil (10).

REMARKS

An Abstract is enclosed on a separate sheet filed herewith.

The claims are amended to eliminate the multiple dependent form in which the claims were originally filed.

Respectfully submitted

Date: 10 October 2000

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EXPRESS MAIL LABEL NO. EK752842283US

09/673115
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DEVICE FOR INCREMENTAL MEASUREMENT OF POSITION

The present invention relates to a device for the incremental measurement of the displacement and position of two objects relatively movable in translation.

Devices of this type are known, for example, from patent applications WO 89/02570 and WO 91/04459. These devices comprise a scale connected to one of two objects, said scale consisting of a metal ribbon comprising a graduation formed by a longitudinal succession of openings with pitch p and width p/2, as well as an electromagnetic detector connected to the other of said objects and which explores the graduation of the scale, thus providing a measurement signal representative of displacement.

According to application WO 89/02570, the detector, which can, for example, be magnetic, magnetoresistive, inductive, or capacitive, can comprise a single element placed on one side of the perforated ribbon.

According to application WO 91/04459, detection occurs through the use of a permanent magnet that generates a magnetic field and a magnetic field detector element arranged on the same side as the scale. However, an inductive detector based on eddy current losses can also be used between the openings in the scale. In all cases it is the variation in induction that produces the measurement signal, which operates within the two following limits of resolution or definition.

In industrial use play in the scale guide system is needed to provide room for the passage of chips, which are often carried along by the scale, as well as to allow the free movement of the scale at high speed.

The results in play in the scale, which moves away from and back to the detector, causing the shape and amplitude of the detected signal to vary. Also, according to the laws of magnetic induction, variations in the speed of travel of the scale result in variations in the amplitude and shape of the signals, unsuitable for processing and which prevent any form of operation other than go/no-go. This limits the resolution obtained between the openings, which cannot be easily reduced by simple methods.

To overcome these various drawbacks, the invention describes the realization of a device for measuring displacement and position, using a perforated metal ribbon, which, unlike the previous devices shown by the prior art, implements a measurement signal that is less sensitive to movements of the scale and variations in its speed. The invention is designed to obtain a stable signal that is easy to implement and which offers greater resolution or definition than that provided by the prior art.

To this end the invention concerns a device for the incremental measurement of displacement and position of two objects relatively movable in translation, comprising a scale connected to one of the two objects and consisting of a metal ribbon comprising a graduation formed by a longitudinal series of openings with pitch p and which present, lengthwise along the scale, a dimension p/2, a detector connected to the other of said objects, which explores the

graduations on the scale, said detector comprising two parts situated on opposite sides of the scale, and a circuit for operation of the detector measurement signal, characterized in that the detector comprises a transmitter arranged on one side of the scale, comprising at least one coil powered by a monovoltage high-frequency pulsed electrical signal and designed to produce a high-frequency electromagnetic field concentrated on the scale, and a receiver, arranged on the opposite side of the scale, facing the transmitter coil and designed to produce, by induction, a high-frequency chopped electrical signal, which is amplitude-modulated by the scale during displacement between a high amplitude, which occurs when the scale is located between the transmitter coil and the receiver, and a low amplitude, which occurs when an interval between two successive openings on the scale falls between the transmitter coil and the receiver.

By monovoltage high-frequency pulsed electrical signal, we are referring to a signal above a frequency on the order of 1 MHz. Unlike lower frequencies, such as those on the order of tens of kHz, these high frequencies can be used to prevent deviations in signal amplitude and shape associated with thermal variations and the square of the speed of travel of the scale.

A transmitter is arranged on one side of the scale and comprises at least one coil powered by a monovoltage pulsed electrical signal to produce a high-frequency electromagnetic field.

A receiver or antenna is arranged on the side opposite the scale, facing the transmitter and turned to receive the transmission of the high-frequency signal.

Hereafter, this antenna is represented in the nonlimiting form of a coil. To simplify the representation any other HF field-effect receiver can also be used.

Through the Faraday screen effect the displacement of the scale modulates the high-frequency signal transmitted between a high amplitude-which occurs whenever the signal sent from the transmitter to the receiver passes through an opening in the scale - and a low amplitude - which occurs whenever a metal interval between two openings cuts this transmission. Since the coils and the air gap are fixed, the transmission can only vary in the presence of the scale which behaves like a screen connected to a ground. And because play in the scale has very little effect, the signal obtained is very stable.

Moreover, signal stability is enhanced as detection becomes less dependent on the nature of the metal, the conductivity of the scale or its magnetism, or its speed of travel. In this way, a high-amplitude measurement signal is obtained which is easy to implement using an HF transmission above a frequency on the order of 1 MHz. A detector can preferably consist of two transmitter/receiver groups where the two groups are offset lengthwise along the scale and separated by $n \times p + p/2$, where n is an integer. In this way a metal interval between two openings falls between a transmitter and a receiver whenever an opening falls between the other transmitter and receiver.

Within the context of the invention, each coil can comprise a winding arranged within a ferrite pot core whose dimension, along the length of the scale, appreciably corresponds to the dimension p/2 of the openings along the length of the scale.

According to a preferred embodiment of the invention, the two receiver coils are each connected by an amplifier and rectifier to the same summing amplifier, which supplies a sinusoidal alternating output signal during longitudinal movement of the scale.

According to another preferred embodiment of the invention, each receiver coil has, in parallel, a means of tuning the transmission frequency, in particular, a fixed capacitor, and a means for establishing the symmetry of the reception levels of the two coils, in particular, a variable capacitor.

The attached drawings provide a more detailed understanding of a nonlimiting embodiment of the invention.

Fig. 1 is a lengthwise schematic view of the scale and detector for a device that is consistent with the invention.

Fig. 2 is a partial top view of the detector scale.

Fig. 3, 3b, and 3c represent the signal of the detector shown in Figs. 1 and 2.

Fig. 4 represents the electric schematic of the detector shown in Figs. 1 and 2 and the circuit used to shape the measurement signal.

Fig. 5a and Fig. 5d illustrate signal shapes at various points of the shaping circuit shown in Fig. 4.

Figs. 1 and 2 illustrate a device for the incremental measurement of the displacement and position of two objects relatively movable in translation, whose general characteristics correspond to the teaching of WO-A-89/02570 and WO-A-

91/04456. This device comprises a scale 1 connected to one of two objects and a detector 2 connected to the other object and which explores scale 1.

Scale 1 consists of a metal ribbon, for example, of stainless steel, comprising graduations formed by a succession of longitudinal openings 4 of pitch p. Depending on the length of scale 1, the openings have a width p/2 and are separated by intervals 5 having width p/2, also depending on the length of the scale.

Detector 2 comprises a transmitter part 6, arranged on one side of scale 1, and a receiver part, arranged on the opposite side of scale 1.

The transmitter part 6 comprises, within a common support structure not shown, two transmitter coils 8, each arranged within a coil form 9 consisting, for example, of a ferrite pot core, in such a way that coils 8 are turned toward scale 1. Each circular coil form 9 has a diameter that appreciably corresponds to the width p/2 of openings 4 and intervals 5 between said openings 4 on ribbon 3 constituting scale 1.

Similarly, receiver part 7 can comprise two coils 10 of similar construction as coils 8.

The two transmitter coils 8 and the two receiver coils 10 face each other, these two pairs being offset by a scale length of p + P/2. In this way the movement of the scale always blocks the high-frequency transmission to a receiver whenever the full impact of the HF transmission is received by the other receiver through an opening.

The two transmitting coils 8 are powered by an HF generator 12 in such a way that each transmits a high-frequency field concentrated on the two receivers 10 facing one another. Whenever scale 1 moves as shown by arrow 13, the high-frequency pulsed signal received is amplitude-modulated by the passage of openings 4 and their intervals 5.

Fig. 3a represents the signal induced in the leftmost receiver coil 10 in Figs. 1 and 2 in the presence of an opening 4 between a receiver coil 10 and a corresponding transmitter coil 8. Fig. 3b illustrates the residual signal induced in rightmost receiver coil 10 in Fig. 1, as it passes before interval 5, resulting in a screen between coil 10 and corresponding coil 8. Fig. 3c represents the modulated high-frequency signal induced in each receiver coil 10 during movement of scale 1 as shown by arrow 13.

Signals from the two receiver coils 10 are sent separately to a shaping circuit 14, described in greater detail below, as shown in Fig. 4 and Figs. 5a and 5d.

In Fig. 4 is shown a detector with its two transmitter coils 8 powered in series by high-frequency generator 12 and its two receiver coils 10. Each receiver coil 10 is connected in parallel with a fixed capacitor 15 to tune receiver coil 10 to the transmission frequency, that is, to the frequency of generator 12, and a variable capacitor 16 that can be used to establish symmetry between the reception levels in the two coils 10 nothwithstanding any disparities in the manufacture of the coils, their geometry, mounting, etc. This clearly illustrates

that detection, as explained in the present description, is based on a principle of HF radio transmission and not a ferromagnetic assembly. The modulated high-frequency signal in each receiver coil 10 according to FIG. 3A is transformed in a high-frequency amplifier 17 into an amplitude-modulated alternating signal, as shown in Fig. 5a.

Upon exiting each amplifier 17 the modulated alternating signal is clipped by means of low-threshold diode 18.

Figs. 5b and 5c represent the two modulated high-frequency signals, clipped and shifted 180° from each other, with opposite polarity resulting from inversion of diodes 18.

The two signals according to Figs. 5b and 5c are then sent to summing amplifier 19, which filters the continuous component of these signals and, after summing, can produce a true, symmetric demodulated alternating sinusoidal signal, as shown in Fig. 5d, which can be used as such or, if need be, can be sent to an interpolator to enhance measurement resolution.

Figs. 6, 7, and 8 describe a nonlimiting embodiment of the invention.

Fig. 6 describes a housing 21 containing detectors 7 together with the electronics and guide means 22 for the scale. A cover 24 maintains the two movable slideways in their housings, said slideways being made of an antifriction material and having a longitudinal slot to guide the scale along its edges. The ends of the slot are reinforced against wear from the scale in this region by metal stops 23.

Fig. 7 is a bottom view of cover 24, which shows an integrated retainer 25 which maintains transmitters 6 opposite receivers 7 when cover 24 is attached to housing 21.

FIG. 8 is a cutaway drawing of said cover 24, illustrating transmitters 6 in place and powered in series or in parallel by printed circuit 25. Sealed passages, not shown here, traverse housing 21 and convey power supplied from the high-frequency generator to transmitter circuit 25.

CLAIMS

1. A device for the incremental measurement of displacement and position of two objects relatively movable in translation, comprising a scale connected to one of the two objects and consisting of a metal ribbon comprising a graduation formed by a longitudinal range of openings distributed with pitch p and which present, lengthwise along the scale, a dimension p/2, a detector connected to the other of said objects which explores the graduations on the scale, said detector comprising two parts situated on opposite sides of the scale, and a circuit for operating the detector measurement signal, characterized in that the detector comprises a transmitter (6) arranged on one side of the scale (1) and comprising at least one coil (8) powered by a monovoltage high-frequency pulsed electrical signal and designed to produce a high-frequency electromagnetic field concentrated on the scale, and a receiver (7) arranged on the opposite side of the scale (1), facing the transmitter (6) coil (8) and designed to produce a high-frequency chopped electrical signal by induction, which is amplitude-modulated by the scale (1) during displacement between a high amplitude, which occurs when an opening (4) on the scale is found between the coil (8) of the transmitter (6) and the receiver (7), and a low amplitude, which occurs when an interval (5) between two successive openings (4) on the scale (1) falls between the transmitter (6) coil (8) and the receiver (7).

2. Measurement device according to claim 1 characterized in that the receiver (7) comprises at least one coil (10) arranged facing the coil (8) of transmitter (6).

3. Device according to claim 1 or 2, characterized in that the scale (1) consists of a stainless steel ribbon (3).

4. Device according to one of claims 2 or 3 characterized in that each coil (8, 10) comprises a winding arranged in a coil form (9) consisting of a ferrite pot core whose dimension, in the lengthwise direction of the scale (1) appreciably corresponds to the dimension (p/2) of the openings along the same direction.

5. Device according to any of claims 2 to 4, characterized in that each of the coils comprises at least two windings electrically mounted in series and arranged in a common coil form, in such a way that the two windings are spaced, lengthwise along the scale, a distance of n x p apart, where n is an integer.

6. Device according to any of claims 2 to 5, characterized in that each receiver (10) coil has means (15) arranged in parallel for tuning the transmission frequency and means (16) for establishing symmetry between the reception levels of the two coils (10).

7. Device according to claim 6, characterized in that the tuning means is a fixed capacitor (15) and the means for establishing symmetry is a variable capacitor (16).

8. Device according to any of claims 2 to 7, characterized in that the transmitter (6) and the receiver (7) each comprise two coils (8, 10) offset

lengthwise along the scale (1) by n x p + p/2, whereas n is an integer, in such a way that the interval (5) between two successive openings (4) falls between a transmitter (6) coil (8) and the corresponding receiver (7) coil (10) whenever an opening (4) falls between the other transmitter (6) coil (8) and the corresponding receiver (7) coil (10).

9. Device according to claim 8, characterized in that the two coils (10) of the receiver (7) are each connected by an amplifier (17) in series with a rectifier (18) to a summing amplifier (19) that supplies, during longitudinal movement of the scale relative to the detector, an alternating sinusoidal output signal whose frequency is twice the modulation frequency of the signals induced (10) in the receiver (7) coils.

[Three pages of drawings follow. Bottom of each page reads: "REPLACEMENT SHEET

(RULE 26)".]

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ABSTRACT

The invention concerns a device for the incremental measurement of displacement and position of two objects relatively movable in translation, comprising a scale (1) connected to one of the objects and consisting of a metal tape including a scale formed by a longitudinal series of openings (4). The scale slides in a housing provided with high-frequency transmitters (6) on one side of the scale and high-frequency receivers (7) on the other surface. When the scale (13) moves along, the receivers supply measurement signals by the alternation of the openings (4) that open the high-frequency field on the receivers (7) then by the interposition of the metal intervals which protect them from the high-frequency field.

Fig.1

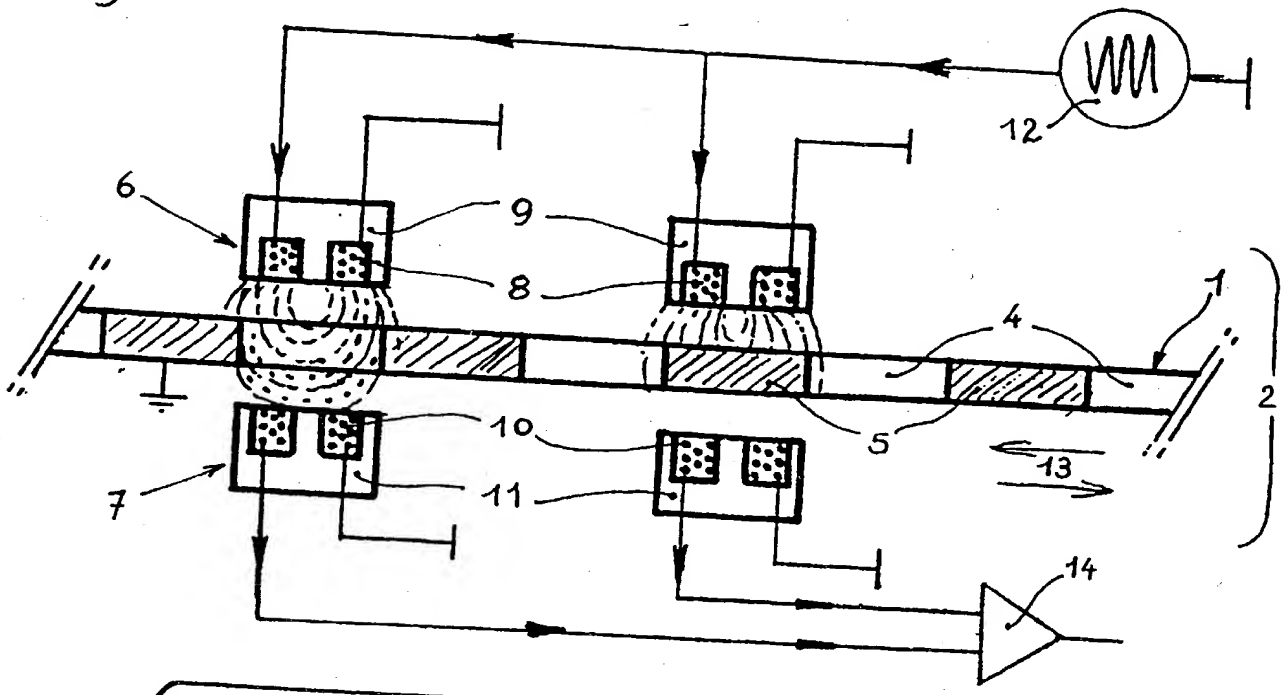
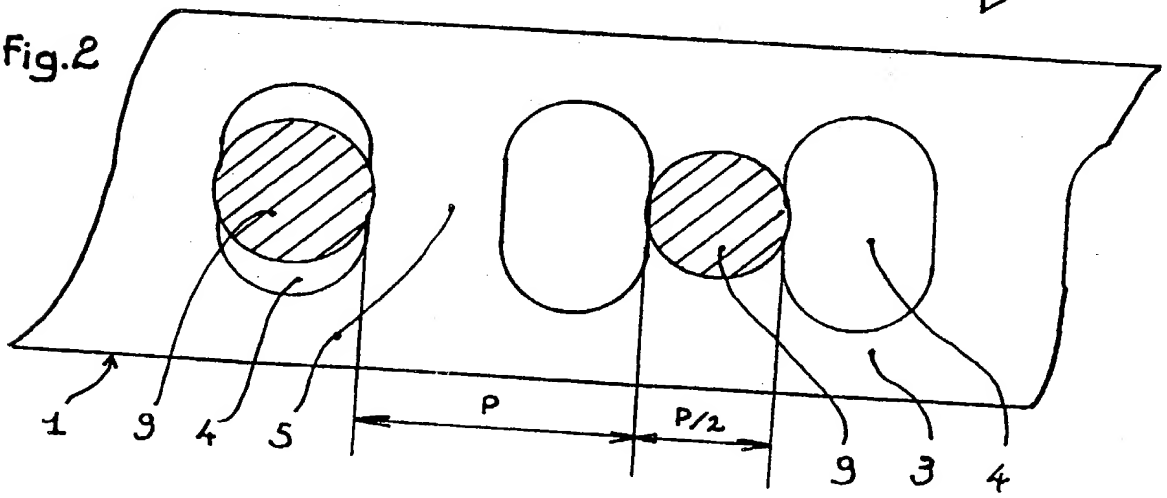


Fig.2



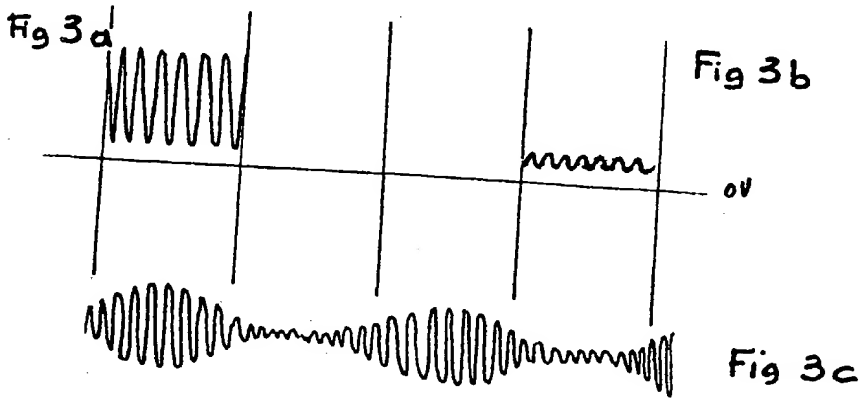


Fig 4

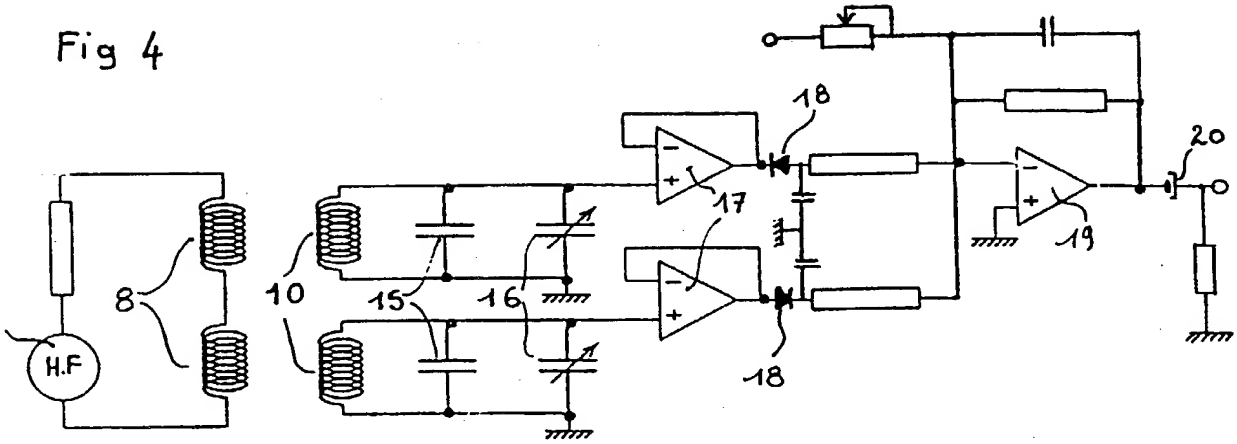


Fig 5a

Fig 5b

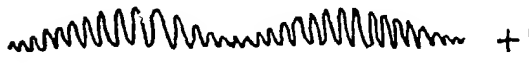


Fig 5c

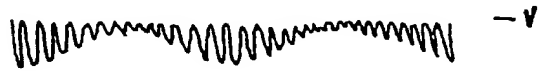


Fig 5d

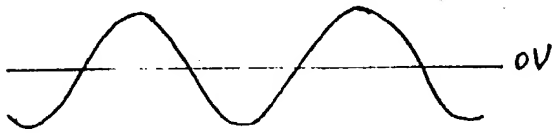
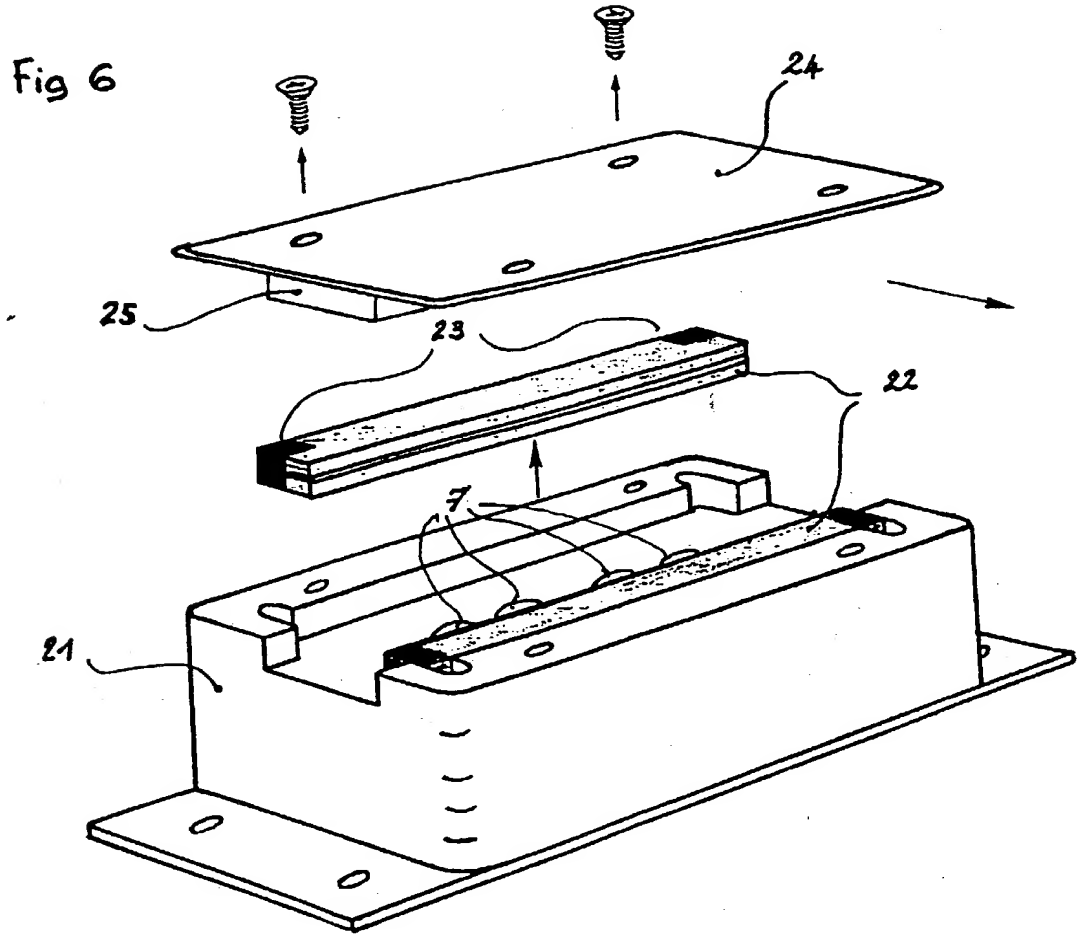


Fig 6



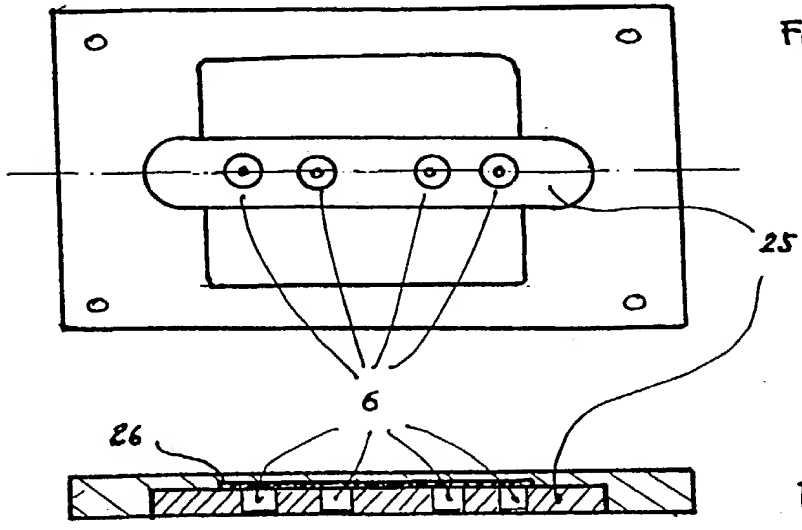


Fig 7

Fig 8

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DECLARATION FOR PATENT APPLICATION

Attorney Docket No. DEN272

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

DEVICE FOR INCREMENTAL MEASUREMENT OF POSITION

the specification of which

is attached hereto unless the following box is checked:

_____ was filed on 14 April 1999 as United States Application Number or PCT International Application Number PCT/FR99/00873 and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.
I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, Section 1.56.
I hereby claim foreign priority benefits under Title 35, United States Code, Section 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

Prior Foreign Application(s)

(Number)	(Country)	(Day, Month/ Year Filed)	Priority Claimed
98/05041	France	16.04.1998	x Yes ___ No
			___ Yes ___ No
			___ Yes ___ No

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose information which is material to patentability as defined in title 37, Code of Federal Regulations, Section 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Number)	(Filing Date)	(Status – patented pending, abandoned)
PCT WO 99/54687	April 16th. 1998	
(Application Number)	(Filing Date)	(Status – patented pending, abandoned)

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

(1)

Thomas S. Baker, Jr., Registration No. 25,662
Address all telephone calls to Thomas S. Baker, Jr. at telephone number 614/488-2202 and facsimile number 614/488-2232.
Address all correspondence to Thomas S. Baker, Jr.
1371 West 3rd Avenue
Columbus, Ohio 43212

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

1-(1) Full name of sole or first inventor (given name, family name)
Jean-Pierre BAZENET
Inventor's signature J.P. Bazenet
Date Sept 14th, 2000
Residence 20, rue Paul Doumer, F - 69160 Tassin, France
Citizenship french FR
Post Office Address Same

09673115 .101000
EXPRESS MAIL LABEL NO. EK752842283US

PATENT

APPLICANT OR PATENTEE: _____ Docket No.: DEN272
SERIAL OR PATENT NO.: PCT WO 99/54687
FILED OR ISSUED: _____
FOR: _____

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS *(37 CFR 1.9(f) and 1.27(B))* INDEPENDENT INVENTOR(S)

As the below-named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:
DEVICE FOR INCREMENTAL MEASUREMENT OF POSITION

described in:

[ ] the specification filed herewith
[ ] application serial no. _____ filed _____
[ ] patent no. _____, issued _____

I have not assigned, granted, conveyed or licensed and am under no obligation under contract or law to assign, grant, convey or license any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

[X] no such person, concern, or organization
[ ] persons, concerns or organizations listed below*

** NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities (37 CFR 1.27).*

FULL NAME: J. Pierre Bazenet
ADDRESS: 20 Rue P. Doumer 69160 TASSIN - France
[X] Individual [ ] Small Business Concern [ ] Nonprofit Organization

FULL NAME: _____
ADDRESS: _____
[ ] Individual [ ] Small Business Concern [ ] Nonprofit Organization

FULL NAME: _____
ADDRESS: _____
[ ] Individual [ ] Small Business Concern [ ] Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein are of my own knowledge, are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Jean-Pierre Bazenet		
NAME OF INVENTOR	NAME OF INVENTOR	NAME OF INVENTOR
Jean Pierre Bazenet		
SIGNATURE OF INVENTOR	SIGNATURE OF INVENTOR	SIGNATURE OF INVENTOR
Bazenet		
DATE	DATE	DATE
September 14 th, 2000		